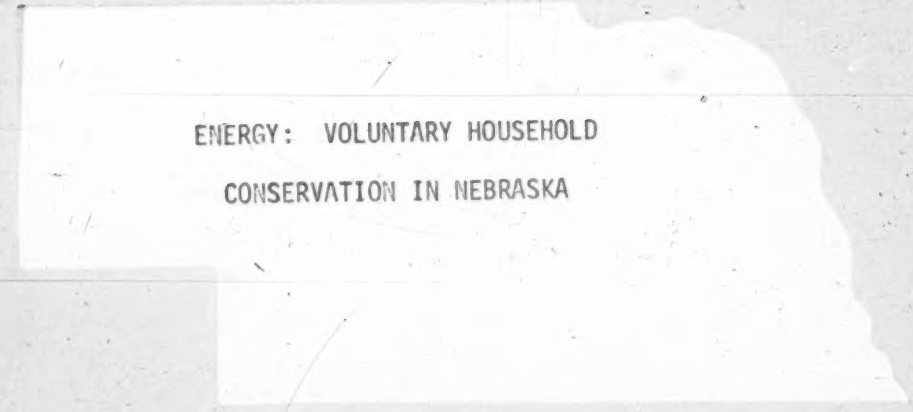
U7870-1.2 A
Recd 4/80

NASIS



ENERGY: VOLUNTARY HOUSEHOLD CONSERVATION IN NEBRASKA

UNL

NEBRASKA ANNUAL SOCIAL INDICATORS SURVEY

Bureau of Sociological Research
Department of Sociology
University of Nebraska–Lincoln
Lincoln, Nebraska 68588
Telephone: (402) 472-3672

BEST AVAILABLE COPY

NASIS-79 #6

ENERGY: VOLUNTARY HOUSEHOLD CONSERVATION IN NEBRASKA

Lynn K. White
Department of Sociology

and

Nikolai Rudakov
State Energy Office

Price: $1.00

The Nebraska Annual Social Indicators Survey

Lynn K. White: 1979 Study Director

The findings in this report are based on data collected in the third Nebraska Annual Social Indicators Survey (NASIS). This survey is part of an on-going study of the quality of life in Nebraska conducted by the Bureau of Sociological Research at the University of Nebraska-Lincoln.

In 1979 a representative sample of 1882 Nebraskans eighteen years of age or older living in households was interviewed by telephone. The respondents to the 1979 survey are part of a panel originally selected and interviewed in 1977 and 1978. They will be re-interviewed every two years in order to provide information on changing quality of life. The interviews averaged approximately 40 minutes and included questions about environment, health, crime, political attitudes, occupation, education, family life and other matters reflecting the quality of life experienced in the state. For the entire sample, 95 out of 100 times the percentages computed from the items asked on the survey are likely to be accurate to within plus or minus 2.3 percent of the figure that would have been obtained if each adult in Nebraska had been surveyed. This is an estimate of maximum error and for most items the percentages are likely to be even more accurate.

The data gathered by NASIS are used by a wide variety of State and local government agencies for policy and program planning and by faculty and students at the University of Nebraska and other colleges for research. No information identifying any respondent is released to any users and the strict confidentiality of individual respondents is rigidly enforced. While the final responsibility for the organization and structure of the survey and for reports produced under its name rests with the Bureau of Sociological Research, public agencies and University departments play an integral part in planning the survey through an Advisory Committee. Public organizations interested in membership on the Advisory Committee should contact the NASIS Study Director.

Funding for NASIS comes from the University of Nebraska, The Bureau of Sociological Research, and State and local agencies which buy items and data analysis from the survey.

The NASIS surveys are repeated each year to measure changes in the quality of life in Nebraska. While there is a core of questions which is included every year, each survey has a large component of unique items which address specific topical issues. Plans for future years include interviewing a new sample of Nebraskans in 1980 as well as continuing to re-interview the 1977 panel every two years to assess changes in their lives. Additional detail on the NASIS surveys regarding use of the survey data or cost of purchasing items on future surveys can be obtained by contacting Lynn K. White, NASIS Study Director, at the Bureau of Sociological Research or by sending for a copy of the 1980 NASIS Prospectus.

The University of Nebraska-Lincoln, an Affirmative Action/Equal Opportunity Employer, supports equal educational opportunity and offers the information listed herein without regard to age, sex, race, handicap, national origin, marital status, veterans status, or religion.

During the last six years several crisis-like events have focused American attention on energy use and resources: the 1973 oil embargo, the 1977-78 winter shortage of coal and heating fuel, the Three-Mile Island nuclear danger, and, more recently, the increases in the price of automotive gas and the cut-off of Iranian oil. The impact of these successive shocks has been to force concentrated re-examination of all of our energy resources: electricity, oil, natural gas, and coal. So far, the many conferences, committee, and cabinet meetings have produced few definitive answers to how we are to meet energy needs in the future. All of the suggested remedies have their drawbacks: strip mining Montana and Wyoming for coal or shale oil, increasing environmental danger through large increases in coal burning, building nuclear reactors, building new hydroelectric dams (many of which would require flooding national park areas.)

Probably the most publicly acceptable means to postpone our exploitation of these alternatives and reduce our dependence on foreign oil is to conserve -- to use fewer energy resources now and to leave more for the future. This can be done in two ways: 1) to build better houses, automobiles, etc., so that the same comfort level is achieved with less use of energy; and 2) to use fewer of these commodities -- to drive fewer miles and to have less heat. The second alternative is the quickest way to conserve energy: it requires no new capital expenditures and is effective immediately. It does, however, require sacrifices in comfort and convenience which many people are unwilling to make. While in the long run, better construction should enable us to continue to drive and live in comfort with less energy use, immediate reductions in energy consumption will require personal adjustments in style of life and convenience.

All of the experts agree that immediate conservation is an important element to solving our energy problems. While many experts feel that it should be mandatory, conservation has been largely left to the individual's conscience -- with a prod from his pocketbook. Many energy economicsts believe that a vital key to

encouraging individual conservation of energy is to raise the cost of energy sharply. They claim that Americans have based their life style on artificially low energy prices (often 1/3 to 1/2 the cost of current production) and that if Americans had to face the real cost of the energy they consume, they would sharply change their habits. While there is significant consensus that this policy would produce lower energy consumption, there are important questions about its social implications: what will happen to the poor and elderly in our society when the price of heating oil triples? This is especially concerning in the case of the elderly, who need more heat than younger and more active citizens. Still others argue that long-time habits cannot be changed abruptly and that price hikes will increase everyone's expenditures with negligible energy savings.

The purpose of this report is not to provide answers to any of these questions, but to provide data on actual compliance to conservation guidelines in home heating and cooling in Nebraska. Using data on current levels of heating and cooling plus data on voluntary conservation in Nebraskan households, we address questions concerning the impact of voluntary conservation campaigns and look carefully at the differential impact of these campaigns on various subgroupings of the population.

Study Design

The data for this report come from the Nebraska Annual Social Indicators Survey. In February-March of 1979, over 1800 Nebraskans were interviewed by telephone by the Bureau of Sociological Research on topics including crime rates, health, quality of life, and home energy use. The questions on energy use were included at the request of the State Energy Office.

All respondents were asked at what temperature they set their thermostats during the day that winter (1978-79), whether this was a change from last year, and if so, how many degrees. The same questions were asked about winter nighttime temperatures and summer air conditioning. In the case of winter daytime

temperatures, respondents were also asked to compare their current heating pattern to that of 1973, the year of the first major price hike. Not all respondents are included in the analysis: those respondents who do not control heating and cooling temperatures with a thermostat are excluded in this analysis, and, of course, not everyone has air conditioning.

Sample Size

	Heating	Cooling
Original	1882	1882
No Heating/Cooling	--	385
No Thermostat	104	451
Final Sample	1778	1046

Findings

Recent federal targets for home conservation suggest that homes should be heated to no more th[an] 65° during the day and 55° at night.[1] Our data indicate that Nebraskans ha[ve a] long way to go before they meet either goal. Average thermostat settings in Nebraskan homes last winter were 69° during the daytime, but only two degrees lower, 67°, during the night. This suggests significant room left for energy conservation efforts. In terms of summer temperatures, Nebraskans kept their homes a little cooler than federal guidelines suggest (76° versus 78°), but not substantially.

Energy conservation goals, like 65° for daytime home heating, are not intended to produce absolute uniformity. Obviously, some people, especially the elderly and the inactive, will want to keep their thermostats set higher than others. Rather the goal is to reduce the average thermostat setting to 65°. Thus it is instructive to examine average thermostat settings of various population

[1]Winter Survival: A Consumer's Guide to Winter Preparedness. Department of Energy, No. DOE/OPA-0019R(2-79). Washington, D.C.: Government Printing Office.

subgroups. These are presented in Table 1, grouped by income factors, age and health factors, and residential factors.

There is currently no difference to speak of between the mean temperatures among households. Households with elderly residents or those in ill health tend to keep their houses only one degree warmer during the winter.[2] Even where we would expect the largest difference in home heating, a comparison between those whose landlords pay for their heat and all others, we find only one degree difference. Virtually the same story occurs when we look at air conditioning. There is little variation among subgroups: people in the bigger cities, people with more money tend to keep their houses about one degree cooler than others. Although their consistency indicates that these differences are probably real enough, they are minor and unimportant. The overall conclusion is that there is a remarkable uniformity in heating and cooling among Nebraskans. Regardless of their ability to meet high utility bills, regardless of their age, residence, or health, Nebraskans heat their homes to 69° during the day, turn it down an average of two degrees at night, and cool their homes to 76° in the summer. It might also be added that this is regardless of federal conservation guidelines.

Current conformity to federal guidelines is thus very low. The question arises as to how great an effort Nebraskans have made to reduce their energy use and whether all groups have particinated equally in this effort. Table 2 presents the percent in each group who have changed their behavior to a more conservative use of energy by lowering their thermostat setting in the Winter and raising it in the Summer.

Overall these data indicate that a significant proportion of Nebraskans have been immune to requests to reduce energy consumption. Only 52 percent of our respondents reported that daytime temperatures in their homes were lower than in 1973 and 30 percent had lowered their thermostat setting in the last year. Changes

[2]Although we defined anyone over 65 as elderly, even when we look at households with residents over 80, we find the average daytime winter thermostat setting is only two degrees higher than average or 71°.

in nighttime heating and in air conditioning were even smaller: only 21 and 16 percent respectively had been more conservative in their use of energy in the last year.

It is instructive to examine conservation efforts by various population subgroups. These are presented in Table 2 grouped by income, age, and health, and residential factors. The data indicate considerable variation in conservation efforts over subgroups, especially between 1973 and 1979.

By income it appears that the greatest conservation through thermostat adjustments between 1973 and 1979 took place among the better off groups: sixty percent of the respondents with family incomes over $20,000 or those who rated their incomes above average had lowered their thermostats whereas only 40 percent of the poorer groups did so. Taken in conjunction with the current uniformity among income groups, these data suggest that there must have been considerable disparity in heating in 1973 such that greater warmth went with greater income. Much of this disparity in daytime heating seems to have been ironed out between 1973 and 1977: all income categories were similar in their attempts to lower their thermostats during the last year.

Changes in nighttime heating and in air conditioning patterns have been smaller since 1977 than changes in daytime heating. While the differences among income groups are not large, it again appears that the greatest changes have taken place in the upper income groups. This pattern suggests that more may be at work in producing conservation than increased cost; were that so we would expect the greatest changes to appear in the lower income groups.

In terms of health and age, it appears that those respondents in poor health or those in homes with an elderly resident are least likely to have turned down their thermostats in the winter or to have raised their thermostat in the summer. Note that this suggests that in 1973 the elderly had <u>lower</u> temperatures than younger people and that the effect of subsequent change is to produce relative uniformity.

The data in Table 2 by residence indicate that apartment dwellers and people who do not pay their own utility bills are the least likely to have made conservation efforts. In terms of heating and cooling, people in rural areas and Western Nebraska have been slower to turn down their thermostats and residents of Lincoln and Southeast Nebraska the quickest.

Overall these data suggest that, while half of the population responded to appeals to adjust their thermostats for energy saving, a large majority of Nebraskans have no enthusiasm for this means of energy conservation: only 20-30 percent of the households in Nebraska reduced energy use through thermostat adjustment within the last year. There is substantial variation in extent of compliance with recommendations showing that the poor, the ill, the elderly, and the rural parts of the population have made the fewest recent cutbacks. The fact that these groups currently have energy use patterns very similar to the rest of the population suggests that they may have been less extravagent with energy use in the past than other groups. The effect of increasing prices and the energy crisis has been the strongest for those who were previously using more energy--the healthy, the young, the well off, and the urban segments of the population.

It is clear that price increases in the range experienced by March, 1979, were not sufficient to encourage widespread energy conservation. Nor does it appear that solely economic motives are behind the energy reductions that have so far taken place. If this were so, we would expect to find the most conservative thermostat settings and the greatest reductions among the poorer segments of our society. Since the opposite seems to be true, we speculate that it may be other values favoring conservation and general public spirit which have effected changes in energy use.

In order to test this hypothesis, we present energy use changes by several measures of attitudes and values. Table 3 cross-classifies energy reduction by respondent's education, by a measure of public participation, and by attitudes

toward a parallel issue--water conservation.

Education is often correlated with greater knowledge and interest in public issues. Thus the question here is whether presumably greater knowledge of energy issues has had any effect on behavior. The data in Table 3 indicate that indeed it has: the greater one's education, the more likely are reductions in energy use for heating and cooling. There is, of course, a strong correlation between education and income and it is possible that greater awareness of the energy crisis is behind the substantial decrease in energy use among the higher income groups that we noted in Table 2.

Political participation was measured by asking respondents whether they had engaged in any of the following behaviors in the last year: voting, writing a letter to a newspaper, attending a meeting of the school board or city council, or working in an organization to do something about a community problem. If these activities indicate a public-spirited outlook and an interest and involvement with community welfare, it is possible that they may help to explain energy conservation, especially among those who can afford not to conserve. The data indicate that indeed citizens who are active participants in community affairs are more likely to have adjusted their thermostats to save, especially since 1973.

The last set of items in Table 3 shows thermostat changes by attitudes toward water conservation. If approval of water regulation is taken as an indicator of values favoring conservation, we would expect to find that respondents who favor water regulation will also be those most apt to have voluntarily cut back their own resource use. We do find that those favoring water regulation are more likely to have reduced home energy use than those opposing it. The differences are consistent, but not large.

Other Conservation Measures

We noted in the beginning that there are two ways to conserve energy in home

heating. One was to have a colder house and the other was to build better houses so that the same degree of heat was achieved with less energy use. While the data just reviewed indicate that Nebraskans are reluctant to decrease their comfort level in order to save energy, the survey data also show that many Nebraskans undertook significant investments in order to reduce energy use in their homes: 55 percent added weatherstripping or window caulking, 24 percent added storm windows and 21 percent storm doors, 44 percent ceased heating unused rooms, 22 percent added insulation to the attic of their homes and 15 percent added insulation to the walls. Others purchased better drapes or installed more efficient heaters. All of these figures refer to conservation measures taken within the last two years; many more Nebraskans acted earlier to reduce home energy use.

Overall 79 percent of Nebraskan households had undertaken at least one of these voluntary conservation measures over the last two years. Thus while Nebraskans have generally hesitated to follow federal guidelines on thermostat settings, the majority of them are willing to invest their labor and money in order to preserve an existing life style and level of comfort with lower energy use. Because many of these conservation efforts require spending money to save money, however, we would expect that these conservation measures would be unequally available to all Nebraskans.

If we examine utilization of these other conservation measures by the same background factors that we looked at earlier, we do in fact find significant differences in the extent to which subgroups have implemented conservation efforts (Table 4). The two most salient factors influencing conservation are income and housing status.

As expected, respondents with higher incomes are more likely to have engage in one or more of these conservation measures. Data on housing status, however, indicate that incentives to invest may be as important as ability to invest: respondents who are renting their homes and especially those who are renting

apartments are least likely to have implemented one of these conservation measures. Because almost all of these alternative measures involve capital expenditures, it is understandable that renters have been unwilling to spend money to raise someone else's property values. Unfortunately, because most renters pay heating and cooling costs themselves, there is little incentive for landlords to introduce energy saving measures.

The other people on this table indicate that respondents who are healthier, younger, living in rural areas, or in the South Central part of the state are more apt to have engaged in one of these energy saving practices. These findings are probably due to the fact that age and health are related to income and that regional distribution is related to housing status. These two factors, economic ability and economic incentive, seem to be the driving forces behind most alternative conservation measures.

Discussion

Home heating and cooling represent a significant proportion of all of Nebraska's energy use. Recent figures show that heating and cooling represent 75 percent of all home energy use and a significant 22 percent of the entire state's energy use.[3] Thus, this is an arena in which increased conservation could have an important impact on overall energy use.

The data in this report give a mixed picture of the success of voluntary conservation efforts. Most Nebraskans keep their daytime thermostats at 69°, within four degrees of the federal guidelines. In spite of increasingly dire warnings, however, only half acknowledge reducing their thermostat setting during the last six years. In terms of nighttime winter thermostat settings, only 30 percent report having lowered their thermostat setting in the last year and there is

[3] 1977 Nebraska Energy Consumption. Prepared for Senator Don Wesely, Nebraska State Legislature, Lincoln, Nebraska, 68509. July 1979.

striking agreement over the state on a setting of 67°--a full twelve degrees above suggested federal guidelines.

When we look at those people who have conserved home energy use, we find that the families that have the highest incomes have made the most reductions in home energy use. This suggests that the relationship between energy cost and energy use is neither simple nor direct. Values and attitudes seem to influence energy use as much as income or age. It may be that the connection between energy use and income will become clearer when energy costs increase still more, but at the time of the survey home thermostat settings for heating and cooling were not strongly related to economic factors.

While Nebraskans have been generally reluctant to comply with recommendations to alter their thermostat settings, they have shown significant willingness to spend time and money to reduce energy waste in their homes. Again, however, we find that the increasing cost of energy is not sufficient to encourage immediate large-scale conservation. Capital investment in energy conservation, for example to install insulation or a new heater, is a long-term investment. A significant proportion of Nebraskans cannot afford this investment. Another significant proportion do not have sufficient financial incentive to do so. This is demonstrated by the fact that only 33 percent of apartment dwellers used conservation measures other than thermostat adjustments compared to 83 percent in single family houses.

Survey data suggest to us that building codes need to be adopted to require new construction to meet high standards of energy efficiency and perhaps even the retrofitting of older homes and apartment buildings. In addition, current programs to help low-income homeowners reduce energy waste must be strengthened.

In conclusion, NASIS-79 showed that the relationship between energy cost and energy use is neither simple nor direct. It appears that besides solely economic motives there are many others behind the energy reductions that have so

far taken place. Clearly, if new and substantial energy savings are to be achieved, more pressure, economic and social, will have to be applied. While many homeowners reduced energy waste, there is much left to be done.

The survey data showing a very high degree of non-compliance with nighttime thermostat guidelines indicate both an area of high potential savings and an area where there are obviously some obstacles to public acceptance. These obstacles need to be identified and overcome.

Table 1. Mean Thermostat Settings for Daytime and Nighttime Heating During the Winter of 1978-79 and for Cooling During the Summer of 1978.

	Heating			Cooling	
	Daytime Setting	Nighttime Setting	Number	Setting	Number
TOTAL	69	67	1741	76	955
Household Income*					
Less than $10,000	70	67	355	78	233
$10,000 - $19,999	69	67	473	76	374
$20,000 and over	69	67	522	75	502
Subjective Income					
Far below average	69	67	48	76	18
Below average	69	66	332	77	151
Average	69	67	985	76	523
Above average	69	67	376	75	257
Health Rating					
Excellent	69	67	712	76	407
Good	69	67	773	76	426
Fair	69	67	223	76	95
Poor	70	67	52	75	24
Chronic Health Problem					
Yes	70	67	428	76	215
No	69	67	1333	76	738
Presence of Residents Over 65					
Yes	70	66	401	77	171
No	69	67	1342	76	746
Housing Structure					
Detached Single Family Dwelling	69	67	1515	76	792
Apartment	70	68	115	76	101
Other	70	67	113	78	25

Table 1. Mean Thermostat Settings for Daytime and Nighttime Heating During the Winter of 1978-79 and for Cooling During the Summer of 1978. (Continued)

	Heating			Cooling	
	Daytime Setting	Nighttime Setting	Number	Setting	Number
Person Responsible for Utility Payments					
Respondent	69	67	1564	76	330
Landlord	70	67	177	76	87
City Size					
Rural Area	69	66	263	76	105
Less than 10,000	69	66	600	77	267
10,000 - 49,999	69	67	291	76	161
Lincoln	69	67	185	77	118
Omaha	69	67	404	75	266
Region					
Panhandle	69	66	112	79	24
Southwest	69	66	171	77	69
South Central	69	66	248	76	118
North	69	66	213	77	98
Greater Omaha Area	69	67	569	75	373
Southeast	69	67	430	77	235

*Because number of refusals and don't know responses vary by question, the number of respondents is not always the same for each variable. This is important only for household income, for which twenty percent of the respondents refused to provide an answer.

Table 2. Percent Changing Thermostat Settings Toward Reduced Energy Use.

	Daytime Heating		Nighttime Heating	Air Conditioning
	Since 1973	Since 1977	Since 1973	Since 1973
TOTAL	52%	30%	21%	16%
Household Income*				
Less than $10,000	41%	32%	17%	12%
$10,000 - $19,999	51	29	23	19
$20,000 and over	61	28	22	17
Subjective Income				
Far below average	36%	30%	17%	15%
Below average	52	32	22	13
Average	49	28	20	16
Above Average	60	28	20	18
Health Rating				
Excellent	57%	28%	21%	17%
Good	50	29	20	14
Fair	42	31	22	18
Poor	37	23	10	17
Chronic Health Problem				
Yes	44%	26%	19%	18%
No	54	30	21	15
Presence of Residents Over 65				
Yes	37%	22%	12%	11%
No	54	31	22	16
Housing Structure				
Detached Single Family Dwelling	52%	29%	20%	15%
Apartment	36	23	18	9
Other	44	32	21	12

Table 2. Percent Changing Thermostat Settings Toward Reduced Energy Use. (Continued)

	Daytime Heating		Nighttime Heating	Air Conditioning
	Since 1973	Since 1977	Since 1973	Since 1973
Person Responsible for Utility Payments				
Respondent	52%	29%	20%	16%
Landlord	48	26	19	10
City Size				
Rural Area	43%	28%	17%	10%
Less than 10,000	50	28	19	14
10,000 - 49,999	53	32	23	13
Lincoln	60	35	25	26
Omaha	49	25	19	14
Region				
Panhandle	33%	26%	15%	6%
Southwest	46	26	21	15
South Central	55	35	22	14
North	50	28	17	12
Greater Omaha Area	50	25	19	14
Southeast	54	33	21	18

*Because number of refusals and don't know responses vary by question, the number of respondents is not always the same for each variable. This is important only for household income, for which twenty percent of the respondents refused to provide an answer.

Table 3. Percent Changing Thermostat Setting Toward Reduced Energy Use by Education, Political Participation, and Attitudes Toward Water Conservation.

	Daytime Heating		Night-time	Air Conditioning	Number	
	Since 1973	Since 1977	Since 1977	Since 1978	Heating	Cooling
Education						
Less than high school	36	28	16	16	309	120
High school, 12 years	52	28	20	20	731	380
College, 1-3 years	54	32	22	22	419	241
College, 4 years	58	24	21	21	178	119
College, 5+ years	68	30	23	23	125	95
Political Participation						
Highly Active (3 or more activities)	59	30	21	16	596	612
Active (1 activity)	50	28	20	16	864	440
Inactive (0 activity)	40	28	20	13	324	214
Water Conservation Attitudes*						
Regulate Farm						
Yes	54	30	20	15	631	431
No	48	22	18	17	241	160
Regulate Business						
Yes	53	30	21	15	637	425
No	53	26	17	13	211	149
Regulate Private Citizen Use						
Yes	55	30	19	17	462	303
No	47	27	20	12	422	293

*These questions were asked on only half the sample.

Table 4. Percent Using at Least One Conservation Measure Other Than Thermostat Adjustment.

	Percent
TOTAL	79
Household Income	
Less than $10,000	67
$10,000 - $19,999	83
$20,000 and Over	83
Subjective Income	
Far below average	75
Below average	77
Average	79
Above average	81
Health Rating	
Excellent	81
Good	79
Fair	75
Poor	68
Chronic Health Problem	
Yes	77
No	80
Presence of Residents Over 65	
Yes	72
No	80
Housing Structure	
Detached Single Family Dwelling	83
Apartment	33
Other	70
Housing Status	
Renting	65
Buying	86
Owning	81
City Size	
Rural Area	85
Less than 10,000	80
10,000 - 49,999	80
Lincoln	68
Omaha	70
Region	
[illegible]	78
[illegible]west	82
South Central	89
North	84
Greater Omaha Area	72
Southeast	77

List of reports already released using data gathered in the 1979 Nebraska Annual Social Indicators Survey. These may be purchased at the indicated price from the Bureau of Sociological Research of the University of Nebraska-Lincoln.

Report Number	Title
1	Designs, Procedures, Instruments, and Forms for the 1979 NASIS. Lynn K. White. Price: $7.50.
2	Taxes: Are They Fair? Susan Welch and Alan Booth. Price: $ .50.
3	Nebraska's Children -- Learning to Work. Lynn K. White and David B. Brinkerhoff. Price: $ .75.
4	Nebraskans' Evaluation of Their State Government. Alan Booth and Susan Welch. Price: $ .50.
5	Nebraskans and State Water Policy: Part I. Susan Welch and Gordon Kissel. Price: $ .50.